

MR. L. SCHWENDLER sends us two papers by him: "On Earth Currents," reprinted from the *Proceedings* of the Asiatic Society of Bengal; and "On the General Theory of Duplex Telegraphy," from the *Journal* of the same Society.

"NOTES on a Till or Boulder Clay with Broken Shells, in the lower valley of the River Endrick, near Loch Lomond, and its relation to certain other Glacial Deposits," is the title of a paper by Mr. R. L. Jack, F.G.S., reprinted from the *Transactions* of the Geological Society of Glasgow.

UNDER the title of "Report of the Government Botanist for the year ending June 30, 1874," Baron von Mueller, of Melbourne, has given a *résumé* of the scientific work of the year, carried on by him or under his immediate supervision. In the first place, Baron Mueller refers to the issue during the year of the sixth volume of the "Flora Australiensis," in the production of which he is associated with Mr. Bentham; towards the composition of the seventh volume he mentions that it will include the Grasses, numbering about 250 species, the Rushes, Sedges, Restiaceæ numbering alone about 70 species, the Naiadeæ, Palmaceæ, &c. With regard to the number of species, however, these may be considerably modified before publication. In reference to a botanical appendix which Baron Mueller made to the works of Mr. F. A. Campbell, of Geelong, on the New Hebrides and the Loyalty Islands, which appendix was drawn up from collections made by the author during a visit to these islands, he says: "By such means we have obtained the first connected records of the insular vegetation of those spots of the globe after the lapse of more than a century since their discovery. Such opportunities for research should also be seized on by other travellers, and especially by educated settlers residing on these islands, as thereby will be gained not merely an advancement for phytographic science, but also a closer acquaintance with the natural productions of any of the Pacific insular lands, to the advantage also of Australian industries and commerce." With regard to the Palæontology of Victoria, Baron Mueller describes the vegetation of the Pliocene period as remarkable for its densely umbrageous trees of almost tropical types, which, as very recently ascertained, spread over very extensive areas, where in the present nothing of the past physiognomic grandeur of the vegetation is left. The elucidation of new economic plants and the tests as to their value in the world of commerce has long been one of Baron Mueller's special points. His pen has produced many pamphlets on these and kindred subjects, and from his laboratory have issued many actual results of his researches in this direction. The large collection of chemical products from the various species of Eucalyptus, Melaleuca, Acacia, &c., together with other vegetable products of Victoria, will be remembered by many as forming one of the principal features of the Australian Court of the London International Exhibition of 1873. This collection, which included oils, tars, acetic acids, and alcohol from species of Eucalyptus, Melaleuca, Casuarina, &c., as well as fibres, papers, and starches, were, at the close of the Exhibition, presented to the Kew Museum, where they are now exhibited. In regard to what Baron Mueller terms "field service," he says he was engaged for seven days in December 1873 in investigating the plants in the forest regions of the Upper Yarra and the southern branches of the Goulburn River. Measurements were also taken at this time of the heights of some lofty trees of *Eucalyptus amygdalina*, the highest of which gave 400 ft. To some trees which appeared to be higher access could not be obtained in the short time allowed and the means at command, as the dense jungle would have to be cleared for a base line. A magnificent species of *Festuca* (*F. dives*), discovered in West Gippsland by Baron Mueller in 1860, "was now," he says, "ascertained to have a wide range through the forests

towards the Yarra and Goulburn sources, where among grasses it forms a most stately object, the height of 12 ft. being not unusual, while occasionally this superb grass, in the fern-tree gullies or rivulets, attains, in rich soil, to 17 ft. The result of this journey," Baron Mueller says, "was the discovery of many plants new to Victoria and a few new to science. So far as the country itself is concerned, the Alps are easily accessible for horses from the eastern side, as the slopes are more gradual. The summits can be traversed for many miles with little or no impediment: being at an elevation of from 6,000 to 7,000 ft., they are above the region of trees and shrubs, and are consequently open in all directions."

WE have received the indexes to vol. vii. of "Patents and Patentees," 1872, for the colony of Victoria. The volume contains three separate indexes: "Subject Matter," "Alphabetical Index of Names," "Chronological and Descriptive," and seventeen sheets of illustrations. The work gives in a compact form a good idea of the activity of inventors in the colony.

THE additions to the Zoological Society's Gardens during the past week include a Black-handed Spider Monkey (*Ateles melanochir*) from Central America, presented by Mr. H. Campbell; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. C. Lucas; a Ring-necked Parrakeet (*Palaornis torquata*), from India, presented by Miss Attwood; a Yellow-bellied Parrakeet (*Platyercus flaviiventris*) from Tasmania; and a Little Grebe (*Podiceps minor*), British, purchased.

### SCIENTIFIC SERIALS

THE *Quarterly Journal of Microscopical Science* for this month contains several articles and notices of interest, the most important of which are: "Observations on the Anatomy of *Tenia mediocanellata*," by Mr. F. H. Welch, in which the author describes the detailed structure of that species, which, as he remarks, is considerably more common than the better known *T. solium*. Two plates accompany the description; very instructive sections through the segments in different directions occupying one of them.—Mr. C. H. Golding Bird describes the method to be employed in imbedding in elder-pith for cutting sections, a method more simple and frequently as advantageous as imbedding in wax, the moistened pith adapting itself to the inequalities and supporting the substance to be cut, in a most convenient manner, without the necessity for a tripod, spirit-lamp, &c., required when wax is used.—Mr. W. Archer has a paper "On Apothecia occurring in some Scytonematous and Sirospionaceous Algæ, in addition to those previously known," in which the transfer by Bornet of *Ephēbe pubescens* to the lichens suggested observations as to whether other species, *Stigonema* and allied genera, would not require similar relegation on account of the discovery of apothecia and spermogonia in them. The question as to the nature of these Gonidia-forming Algae types is discussed.—Mr. Ray Lankester makes "Observations on the Development of the Cephalopoda," in which he continues his elaborate investigations on the development of the Mollusca. The points on which most stress is laid in the present paper are the formation of the blastoderm and the nature of the "autoplasts;" the development of the pen-sac, and of the alimentary canal, and especially of the eye, whose radical similarity in the di- and tetra-branchiate Cephalopoda is proved, at the same time that its great difference from the vertebrate organ is rendered equally apparent.—Mr. H. C. Sorby has a paper "On the Chromatological Relations of *Spongilla fluviatilis*," which is shown to contain much the same colouring matter, soluble in carbon-disulphide, as the highest plants, though in different proportions.—The last paper, reprinted from this journal, is Prof. Huxley's "Classification of the Animal Kingdom," read before the Linnean Society in December last.—A review is given of Stricker's "Manual of Histology," as well as an excellent short life, by Dr. Payne, of Dr. Lankester, one of the founders of the journal.

*Astronomische Nachrichten*, No. 2,016.—In this number is a list of some thirty stars, of types iii. and iv., discovered by D'Arrest. Notes on colour and bands in the spectrum of each

are added.—Oppolzer gives the elements of Winnecke's comet (Comet III. 1819), and an ephemeris for every day, from Jan. 1 to March 1, 1875. The eclipse of the sun of October last was observed by H. Bruns and others at Dorpat; four telescopes were used, of 162, 97, 53, and 77 millimetres aperture respectively. It appears that the first contact was observed to take place earlier with the larger instruments than with the smaller; there is a difference of 44 seconds in time in the case of the 162 and 53 millimetre glasses. H. Bruns also contributes some remarks on the finding of the altitude of falling stars.—Dr. J. Holetschek gives elements and an ephemeris for the planet Peitho (118) for the month of Dec.; and Ormond Stone adds a remark on certain equations in the determination of a comet's distance from the earth.—No. 2,017.—Dr. O. Lohse writes to the editor an account of the method of photographing the sun. He apparently uses collodion, containing chloride of silver, or paper, instead of the ordinary sensitive plate. He remarks that the process has the advantage of requiring no chemical preparation for each photograph, and he says the spots are sharply defined.—Prof. Bredichin sends his positions and observations of 22 of the minor planets, the comets of Winnecke, Borrelly, and Coggia; and Fearnley gives a list of 58 stars with their ascertained positions for comparison with Coggia's comet.—Leopold Schullhof gives elements and an ephemeris for the month of Dec. of Planet (139).—Victor Fuss gives the times of contact of four observers of the solar eclipse of October last.

THE *Bulletin de la Société d'Acclimatation de Paris* for September opens with a curious instance, related by M. Duwarnet, of a cross between the red and common grey partridge; the practical use of which, however, is not apparent, though it is a curious example of a cross between two species of birds hitherto regarded as irreconcilable.—M. La Perre de Roo contributes an article on Military Pigeons, which details the uses to which pigeons may be put for military purposes. Russia, Italy, Austria, and Germany have already created establishments for the breeding and training of pigeons with this object.—M. J. Bech pleads the cause of the small birds in France, most of which, as soon as the legal shooting season commences, are killed in large numbers by sportsmen who cannot find better game. He recommends the absolute prohibition of the slaughter of insectivorous birds.—The acclimatisation of sponges is the latest idea of one of the members of the society, who suggests that the celebrated Syrian sponges might be cultivated in the South of France.—The Notes from America include observations on the Mexican Agave, the introduction of mahogany into India, and the tea-productions of that country.

*Der Zoologische Garten*.—In the November number Dr. von Offers discusses the food of the Stork (*Ciconia alba*), and its consequent value to the farmer. He finds the principal items of its bill of fare to consist of frogs, moles, grasshoppers, and the larger carabine beetles.—Dr. Dörner reviews the twelve species of Deer now represented in the Hamburg Zoological Gardens; a Stag (*Cervus elaphus*), aged only two years, has already antlers with twelve points.—H. Thienemann remarks on the habits of the Little Bustard (*Otis tetrax*), which has recently established itself as a breeding species in Thuringia, as has also the Fieldfare (*Turdus pilaris*).—Among the remaining articles are notes on *Plotus leuallantii*, by H. Marno; and on *Tropidonotus tessellatus*, by H. Geisenheyner.

## SOCIETIES AND ACADEMIES

### LONDON

Geological Society, Dec. 16.—Mr. John Evans, F.R.S., president, in the chair.—The following communications were read:—(1) Descriptions of the Graptolites of the Arenig and Llandeilo Rocks of St. David's, by Messrs. John Hopkinson and Charles Lapworth. Commencing with a brief historical account of the discovery of graptolites in the neighbourhood of St. David's, from their first discovery in the Llandeilo series in 1841 by Sir Henry De la Beche and Prof. Ramsay, the authors proceeded to explain their views on the classification of the graptolites (*Graptolithina*, Bronn), which they place under the order *Hydroidea*, dividing them into two groups: *Rhabdophora* (Allman), comprising the true scutate or virgulate graptolites, which they consider to have been free organisms; and *Cladophora* (Hopkinson), comprising the dendroid graptolites and their allies, which were almost certainly fixed, and are most nearly allied to the recent

*Thecaphora*. The distribution of the genera and species in the Arenig and Llandeilo rocks of St. David's was then treated of, and the different assemblages of species in each of their subdivisions were compared with those of other areas. The Arenig rocks are seen to contain a number of species which ally them more closely to the Quebec group of Canada than to any other series of rocks, all their subdivisions containing Quebec species, while the Skiddaw slates, which before the discovery of graptolites in the Lower Arenig rocks of Ramsey Island in 1872 were considered to be our oldest graptolite-bearing rocks, can only be correlated with the Middle and Upper Arenigs of St. David's. The graptolites of the Arenig rocks of Shropshire and of more distant localities were also compared with those of St. David's. In the Llandeilo series of this district the *Cladophora* have now for the first time been found, a few species, with several species of *Rhabdophora*, occurring at Aberiddy Bay in the Lower Llandeilo, which alone has been carefully worked, there being much more to be done in the Middle and Upper Llandeilo, from which very few species of graptolites have as yet been obtained. Some of the recently introduced terms, and altered or more definite terminology, employed in the descriptions of the species were then explained; and the paper concluded with descriptions of all the species of graptolites collected in the Arenig and Llandeilo rocks of St. David's within the last few years of which sufficiently perfect specimens have been obtained, doubtful species being referred to in an appendix. Forty-two species were described, belonging to the following genera:—*Didymograptus*, *Tetragraptus*, *Clemagraptus* (gen. nov.), *Dicellograptus*, *Climacograptus*, *Diplograptus*, *Phyllograptus*, *Glossograptus*, and *Trigonograptus* (*Rhabdophora*); *Ptilograptus*, *Dendograptus*, *Callograptus*, and *Dictyograptus* (*Cladophora*). (2) On the age and correlations of the plant-bearing series of India, and the former existence of an Indo-oceanic continent, by Mr. H. F. Blanford. In this paper the author showed that the plant-bearing series of India ranges from early Permian to the latest Jurassic times, indicating that, with few and local exceptions, land and freshwater conditions had prevailed uninterruptedly over its area during this long lapse of time, and perhaps even from an earlier period. In the early Permian there is evidence in the shape of boulder-beds and breccias underlying the lowest beds of the Talchir group of a prevalence of cold climate down to low latitudes in India, and, as the observations of geologists in South Africa and Australia would seem to show, in both hemispheres simultaneously. With the decrease of cold the author believed the flora and reptilian fauna of Permian times were diffused to Africa, India, and perhaps Australia; or the flora may have existed somewhat earlier in Australia, and have been diffused thence. The evidence, he thought, showed that during the Permian epoch, India, South Africa, and Australia were connected by an Indo-oceanic continent, and that the first two remained so connected, with at the utmost some short intervals, up to the end of the Miocene period. During the latter part of the time this continent was also connected with Mayalana. The position of the connecting land was said to be indicated by the range of coral reefs and banks that now exists between the Arabian Sea and West Africa. Up to the end of the Nummulitic epoch, except perhaps for short periods, no direct connection existed between India and Western Asia.

Zoological Society, Jan. 5.—Dr. E. Hamilton, vice-president, in the chair.—A letter was read from Dr. George Bennett, of Sydney, giving an account of an Indian beetle (*Chrysocrova ocellata*), which had been captured alive in the Bay of Bengal, 273 miles from the nearest land, by Capt. Payne, of the barque *William Mansoon*.—A letter was read from Mr. Anderson, of Futteyghur, East Indies, giving an account of the eggs and young of the Gavial (*Gavialis gangeticus*).—The Secretary read a letter addressed to him by the Marquis of Normanby, Governor of Queensland, announcing that he had forwarded by the ship *Ramsay*, under the care of Capt. Carter, a fine specimen of the Australian Cassowary (*Casuarus australis*), as a present for the Society's collection.—A communication was read from Mr. A. G. Butler, giving descriptions of thirty-three new species of *Sphingidae* in the collection of the British Museum.—A communication was read from Mr. Andrew Anderson, of Futteyghur, giving corrections of and additions to a previous paper by him on the Raptorial Birds of North-western India (P.Z.S., 1872, page 619).—A communication was read from Mr. E. L. Layard, H.B.M. Consul for Fiji and Tonga, containing ornithological notes made in the Fijis, together with descriptions of some supposed new species of birds.